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Claims

What is claimed is:

1. (Currently Amended) An apparatus for mixing liquids comprising:

(a) ~~a liquid sample within~~ a liquid sample container;

(b) a submerged magnetic impeller located in said liquid sample container; and

(c) an electromagnetic driver capable of operating with a single coil located in proximity to said magnetic impeller wherein said electromagnetic driver imparts axial motion to said magnetic impeller and is powered by a signal generator.

2. (Original) The apparatus of Claim 1, wherein said magnetic impeller has a magnetic field coupled to an electromagnetic field of said electromagnetic driver.

3. (Original) The apparatus of Claim 2, wherein said signal generator produces a signal of programmed frequency and current.

4. (Original) The apparatus of Claim 3, wherein said signal of programmed frequency and current causes said electromagnetic field of said electromagnetic driver to vary with time.

5. (Currently Amended) The apparatus of Claim 4, wherein said electromagnetic driver imparts motion in multiple directions to said magnetic impeller in said liquid sample container as a result of a coupled electromagnetic field.

6. (Currently Amended) The apparatus of Claim 5, wherein said motion of said magnetic impeller transfers momentum radially and axially through ~~said liquid sample~~ the liquid contained in said liquid sample container.

7. (Original) The apparatus of Claim 6, wherein said motion of said magnetic impeller is random.

8. (Original) The apparatus of Claim 6, wherein said magnetic impeller is mounted on an axle located within said liquid sample container.

9. (Original) The apparatus of Claim 8, wherein said motion of said magnetic impeller is rotational about said axle.

10. (Original) The apparatus of Claim 6, wherein said electromagnetic driver has no moving parts.

11. (Original) The apparatus of Claim 3, wherein said signal of programmed frequency and current is controlled by a computer implemented algorithm.

12. (Original) The apparatus of Claim 3, wherein said frequency and current of said programmed signal is controlled by an operator.

13. (Original) The apparatus of Claim 11, wherein said signal generator produces a wave form selected from the group consisting of sinusoidal waves, square waves, and sawtooth waves.

14. (Original) The apparatus of Claim 12, wherein said signal generator produces a wave form selected from the group consisting of sinusoidal waves, square waves, and sawtooth waves.

15. (Currently Amended) The apparatus of Claim 3, wherein said liquid sample container comprises ~~an Eppendorf tube~~ a test tube for the processing of small liquid samples having a volume of approximately 2.0 milliliters or less.

16. (Original) The apparatus of Claim 3, wherein said liquid sample container comprises a plurality of vessels arranged in a geometric array.

17. (Original) The apparatus of Claim 16, wherein said geometric array comprises 24 vessels.

18. (Original) The apparatus of Claim 16, wherein said geometric array comprises 96 vessels.

19. (Currently Amended) The liquid sample container of Claim 16, wherein said geometric array is a circular array.

20. (Original) The apparatus of Claim 3, wherein said liquid sample container comprises a container suitable for low gravity applications.

21-36. (Withdrawn).

37. (Currently Amended) A system for mixing liquids comprising:

a) ~~providing a liquid sample within~~ a liquid sample container;

b) a magnetic impeller located within said liquid sample container;

c) a programmable electromagnetic driver capable of operating with a single coil located in proximity to said magnetic impeller and electrically coupled to a signal generator that receives electrical power from a power supply and commands from an electronic controller wherein said electronic controller produces a conditioned electronic signal established by an output of a computer.

38. (Original) The system of Claim 37, wherein said conditioned electronic signal is produced by means of one or more algorithms programmed into said computer.

39. (Currently Amended) The system of Claim 38, wherein said algorithm ~~receives input in the form of viscosity and density of said liquid sample and diffusivity of a solute~~ utilizes data selected from the group consisting of viscosity of the liquid, density of the liquid, and diffusivity of a solute, said computer programmed to receive said data from a user.

40. (Currently Amended) The system of Claim 38, wherein ~~said algorithm receives input in the form of a liquid identifier of a liquid sample selected from a menu~~ said computer is programmed to receive a liquid sample identifier chosen from a menu by a user and corresponding to the type of the liquid contained in said liquid sample container, said algorithm utilizing characteristic data programmed into the computer corresponding to said liquid sample identifier chosen by the user.

41. (Currently Amended) The system of Claim 38, wherein said algorithm ~~receives input in the form of electromagnetic current, frequency, and duration of mixing~~ utilizes data selected by a user from the group consisting of desired electromagnetic current, desired frequency of mixing, and desired duration of mixing, said computer programmed to receive said data from a user.

42-43. (Withdrawn).

44. (Currently Amended) An apparatus for mixing liquids comprising:

a) ~~a volume of liquid within a liquid sample, wherein said liquid sample is contained in~~ a liquid sample container comprising a plurality of vessels arranged in a geometric array;

b) a permanent magnetic impeller located in said liquid sample container;

c) an electromagnetic driver having an electromagnetic field associated therewith, said electromagnetic driver located in proximity to said permanent magnetic impeller wherein said electromagnetic driver comprises no moving mechanical parts; and

d) a signal generator electrically coupled to said electromagnetic driver wherein said signal generator produces a signal of programmed frequency and current which causes said electromagnetic field of said electromagnetic driver to vary with time, thus imparting axial motion to said permanent magnetic impeller ~~in said liquid sample~~ as a result of a coupled electromagnetic field between said permanent magnetic impeller and said electromagnetic driver, and wherein said frequency and current of said programmed signal is controlled by an operator.